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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 09/841,332 | 04/24/2001 | David John Bishop | 54-90-20-65 | 5973 |
| 7590 | 02/19/2004 | | EXAMINER | |
| Peter V. D. Wilde 301 East Landing Williamsburg, VA 23185 | | | LESTER, EVELYN A | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2873 | |

DATE MAILED: 02/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|------------------------------|------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 09/841,332 | BISHOP ET AL. |
| | Examiner Evelyn A. Lester | Art Unit 2873 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
 THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 13 November 2003.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-4 and 6-18 is/are pending in the application.
 - 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-4 and 6-18 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 24 April 2001 is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____. | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

Information Disclosure Statement

1. It is the Examiner's understanding that the list of references in the specification are not intended to be part of an Information Disclosure Statement. That these references are intended to be background information for the specification only. Therefore, no formal consideration has been given to these references beyond their intended purpose of background information for the specification, unless the references have been cited on a PTO-892 form.

Should this assessment of the list of references in the specification be incorrect, the Applicant is requested to provide an explanation or provide a proper Information Disclosure Statement.

RESPONSE TO ARGUMENTS

Claim Rejections – 35 USC § 112

2. Applicant's arguments, see page 8, filed 11-13-2003, with respect to claims 5 and 10-12, have been fully considered and are persuasive. The rejection of these claims under 35 U.S.C. 112 has been withdrawn.

Claim 5 has been cancelled. Claim 10 has been amended to correct the indefiniteness of these claims.

Claim Rejections – 35 USC § 102

3. Applicant's arguments, see pages 9-10 filed 11-13-2003, with respect to the rejection(s) of claim(s) 1-17 under 35 U.S.C. 102 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Guckel et al (U.S. patent 4,203,128; Neukermans et al (U.S. patent 5,629,790); Degani et al (U.S. patent 6,433,411 B1); and Goossen (U.S. patent 5,943,155).

NEW GROUNDS OF REJECTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, 4, 6-8, 10, 11, 13 and 18 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Guckel et al (U.S. patent 4,203,128).

Guckel et al discloses the claimed invention of an electrooptic modulator as evident in Figures 5-7 and their accompanying text, as well as noted at column 1, lines 12-19 and 33-43; col. 2, lines 33-38; col. 4, lines 4-12 and 48-51; col. 5, lines 16-22; col. 7, lines 39-65; col. 12, lines 20-24; and with respect to claim 13, note col. 3, lines 35-60 and col. 9, line 55 to col. 11, line 52.

Specifically with respect to claims 1, 10 and 18, Guckel et al's invention comprises an electrically conductive substrate (620 ; col. 7, lines 52-55), a movable membrane having a top surface and a bottom surface, comprised of a single crystal silicon (or monocrystalline silicon) layer (650; and for example, col. 1, lines 12-14, and col. 7, lines 43-44), a support (630) for positioning the movable membrane at a first position spaced from the substrate by an air gap(640), means for applying an electrical bias across the air gap to move the movable membrane from a first position to a second position (note leads in Figure 6; also col. 7, lines 52-55).

With respect to claim 2, note at column 7, lines 39-65.

With respect to claim 4, note at column 11, line 11.

With respect to claims 6, 7 and 11, note at column 7, line 44.

With respect to claim 8, note element 670 in Figure 6.

With respect to claim 13, please note at column 3, lines 35-60, and also at column 9, line 55 to column 11, line 52.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-4 and 6-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goossen (U.S. patent 5,943,155) in view of Neukermans et al (U.S. patent 5,629,790).

Goossen discloses the claimed invention of an electrooptic modulator as evident in Figures 1-3 and Figures 7-13, and their accompanying text, wherein Goossen's invention has an electrically conductive substrate(31; col. 4, line 37); a movable membrane having a top surface and a bottom surface(32); a support for positioning the movable membrane at a first position spaced from the substrate by an air gap(34); a means for applying an electrical bias across the air gap to move the movable membrane from a first position to a second position (i.e. electrical lead indicated in the Figures). Goossen does not teach the use of a single crystal silicon for the movable membrane.

However, it would have been obvious to one of ordinary skill in the electrooptic modulator art to provide the single crystal silicon material as the movable membrane in Goossen's invention because at the time of the invention, single crystal silicon material was known to have superior characteristics over polysilicon, as taught by Neukermans et al. Neukermans et al explicitly teach that the movable membrane element of the electrooptic modulator is single crystal silicon because of its superior strength and fatigue characteristics, as compared to metals or polysilicon. Note Neukermans et al at column 5, lines 5-8. Therefore, to provide the single crystal silicon material of Neukermans et al's invention for the movable membrane in Goossen's invention would have been obvious to one of ordinary skill in the art in order to improve the stability and

strength of the electrooptic modulator, as taught by Neukermans et al. By improving the stability and strength of the electrooptic modulator, there is provided a reduction in maintenance costs, as well as reducing the inconvenience and time lost for replacing a damaged device too often.

With respect to the manufacturing method claims, note Goossen at Figures 7-13 and their accompanying text, and the above reasons for rejection.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Jin et al (U.S. patent 6,618184 B2) and Degani et al (U.S. patent 6,433,411 B1) both are directed to electrooptic modulators having a movable membrane element made of single crystal silicon.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evelyn A. Lester whose telephone number is (571) 272-2332. The examiner can normally be reached M-F, from about 10 am to 7 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Y. Epps can be reached on (571) 272-2328. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Evelyn A. Lester
Primary Examiner
Art Unit 2873